

**REPUBLIC OF MOLDOVA**  
**POWER MARKET**  
**DURING TRANSITION**

**Regulatory Development  
and  
Power Market Operations**

**Moldova Energy Sector Reform  
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Final Report

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# **Operation of the Power Market During the Transition Period**

## **CONTENTS**

<b>1. GENERAL CONDITIONS .....</b>	<b>1</b>
1 Transition Period.....	1
1.1 Bilateral Contracts.....	1
1.2 Review by System Operator .....	1
1.3 Information Required .....	1
1.4 Adequate System Supplies.....	1
1.5 Scheduling and Dispatch .....	2
1.6 Energy Settlements.....	2
1.7 Settlement Statements .....	2
<b>2. POWER MARKET OPERATIONS DURING 1999 .....</b>	<b>2</b>
2.1 Limitations on Bilateral Contracts .....	2
2.2 Expansion of Contracting Activity.....	3
2.3 Balancing Power .....	3
2.4 Romanian Resources .....	3
<b>3. Power Market Operations during 2000.....</b>	<b>3</b>
3.1 Bilateral Contracts.....	3
3.2 Balancing Power Supplies .....	3
3.3 Additional Contract Activity.....	3
3.4 Notice to System Operator .....	3
3.5 Purchases of Balancing Power.....	4
3.6 Payments for Purchases of Balancing Power .....	4
3.7 Payments for the Sale of Balancing Power .....	4
3.8 Administration of Market Activity.....	4
<b>4. IMPROVING EFFICIENCY OF THE POWER MARKET .....</b>	<b>5</b>
4.1 Metering Equipment.....	5
4.2 Dispatchable Contracts .....	5
4.3 System Losses .....	5
4.4 Market Committees .....	5

## **ANNEX 1**

### **SCHEDULING AND DISPATCH**

# **Operation of the Power Market During the Transition Period**

## **1. GENERAL CONDITIONS**

### **1 Transition Period**

The Transition Period is defined to be the period from the present until January 1, 2001, during which the electric industry in Moldova will evolve from its historic reliance on Moldtranselectro to arrange for all power supplies for the entire power sector to a desegregated, contract-based, competitive market system in which Participants are responsible for their own supply arrangements.

#### **1.1 Bilateral Contracts**

Regulated Supply Licensees shall be encouraged, but not required, to negotiate and sign bilateral power supply contracts with electricity generators or other suppliers in order to meet all, or some, of the power supply needs of their customers;

#### **1.2 Review by System Operator**

The System Operator<sup>1</sup> shall review the terms of all contracts to assure compliance with System Rules and notify in writing the affected Participants and ANRE of its conclusions. Contracts shall not become effective until the System Operator certifies such compliance. The System Operator shall not deny contract certification without presenting good cause in writing, which shall be subject to review by ANRE in the event of a dispute which cannot be resolved by the parties.

#### **1.3 Information Required**

Resource purchasers shall provide monthly, weekly and daily schedules of energy purchases under its contracts and/or such additional information as the System Operator may reasonably require to perform its responsibilities, such as: the total amount of energy to be received, maximum capacity, weekly and/or daily delivery schedules, predetermined conditions, and measures to rectify delivery deficiencies.

#### **1.4 Adequate System Supplies**

The System Operator, on behalf of all Suppliers, shall engage in a bilateral power contract, or contracts, with a reliable utility or power system adjacent to Moldova for Balancing Power and Ancillary Services to assure that, after taking into account the bilateral contracts executed directly by Suppliers, adequate system resources will be available to meet overall power system needs.

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<sup>1</sup> Moldtranselectro acting in its capacity as the entity holding the license for central dispatch services.

### **1.5 Scheduling and Dispatch**

The System Operator shall schedule and dispatch system resources to meet system loads in accordance with Market Rule No. 7, Scheduling and Dispatch, included in Annex 1 attached.

### **1.6 Energy Settlements**

The Settlements Center shall account separately for energy delivered by each producer and delivered to each Supplier under both bilateral contracts and in the Balancing Market. Energy settlement data shall be collected and reported during each hour if feasible or, at a minimum, the hours comprising each of the three separate pricing periods under the contract with Ukraine. The System Operator shall ensure that required data concerning energy flows, based on actual hourly meter readings to the maximum feasible extent, is made available to the Settlements Center. Whenever it is necessary to estimate hourly consumption by Suppliers, due to a lack of proper or timely metering information, the calculation of such estimates shall be prepared by the System Operator, submitted to the affected Participants for review, revised as may be agreed based on Participants' analysis, and, if necessary, submitted to ANRE for disposition of any unresolved disputes.

### **1.7 Settlement Statements**

Settlement Statements shall be prepared and delivered to Participants by the System Operator on or before the 10th business day of the month immediately following the Settlement Month. The Settlement Statement summarises for each Participant all energy received or supplied under contracts and/or through the Balancing Market by Participants during the Settlement Month by each hour of each day or other aggregated time periods as may be agreed.

## **2. POWER MARKET OPERATIONS DURING 1999**

### **2.1 Limitations on Bilateral Contracts**

In order to assure orderly operation of the Power Market during 1999, contracts between Distribution Companies (DCs) and resource providers shall be limited to the following:

- a) Contracts between CHPs and DCs;
- b) Contract between Chisinau DC and MoldovskayaGRES;
- c) Contract between North DC and a seller of energy from Ukraine;
- d) Contract between South DC and a seller of energy from MoldovskayaGRES;
- e) Contract between MTE and a seller of energy from Ukraine;
- f) Contract between MTE and a seller of energy from Romania
- g) Contract between MTE and a seller of energy from MoldovskayaGRES.

## **2.2 Expansion of Contracting Activity**

Market Participants may modify by mutual agreement the limitation on contracts specified in paragraph above, subject to the review and approval of ANRE of such modification. Expansion of resource contract activity shall be subject to the demonstrated ability of the Dispatch Center and Settlements Center to properly discharge their responsibilities for economic dispatch, associated contract administration and the provision of accurate energy settlement statements to all Participants. The System Operator and all Participants will endeavor to remove this restriction on contract activities at the earliest feasible date.

## **2.3 Balancing Power**

After taking into account the bilateral contracts executed directly by Suppliers, the System Operator will contract with Ukraine, Romania, MoldovskayaGRES and any other power provider for Balancing Power and Ancillary Services.

## **2.4 Romanian Resources**

The System Operator may also enter contracts with parties in Romania to provide electricity to specific regions of Moldova which have been electrically isolated from the interconnected transmission system.

# **3. Power Market Operations during 2000**

## **3.1 Bilateral Contracts**

By December 21, 1999, each Supplier shall submit to the System Operator all bilateral power contracts that Supplier has engaged in with wholesale power providers for the year 2000.

## **3.2 Balancing Power Supplies**

After taking into account the bilateral contracts executed directly by Suppliers, the System Operator will contract with Ukraine, Romania, MoldovskayaGRES and any other power provider for Balancing Power and Ancillary Services.

## **3.3 Additional Contract Activity**

Subject to any potential limitations imposed by the terms of its existing contracts or the contract for Balancing Power, Suppliers shall retain rights to explore other market opportunities and engage in additional bilateral power contracts at their discretion.

## **3.4 Notice to System Operator**

By the 20th of each month, each Supplier shall submit to the System Operator all new bilateral power contracts that entity has engaged in with wholesale power providers for the next month or any revisions to existing bilateral contracts previously reported.

### 3.5 Purchases of Balancing Power

All Suppliers which do not satisfy their energy requirements through bilateral contractual arrangements in any hour during the Settlement Month shall be deemed to be buyers of Balancing Power from the Balancing Market.

### 3.6 Payments for Purchases of Balancing Power

Suppliers who purchase Balancing Power shall pay to the System Operator the amount calculated each hour by the following formula:

$$\text{Payment due} = (\text{Energy}_{\text{consumed}} - \text{Energy}_{\text{contracted}}) \times \text{Sales Tariff}_{\text{Balancing Market}}$$

Where:

$\text{Energy}_{\text{consumed}}$  = amount of energy in MWh, adjusted for losses, actually consumed by the Supplier;

$\text{Energy}_{\text{contracted}}$  = actual amount of energy in MWh, adjusted for losses, delivered to the Supplier under bilateral contracts;

$\text{Sales Tariff}_{\text{Balancing Market}}$  = the weighted average price of energy used to supply electricity for the Balancing Market.

### 3.7 Payments for the Sale of Balancing Power

Suppliers may provide energy to the Balancing Market from energy available to the Supplier under its bilateral contracts (including energy in excess of Supplier's own load requirements in any hour).

The System Operator shall accept Supplier offers of energy for the Balancing Market in ascending order to fulfill the system need (for example: X MWs at \$A/MWh, Y MWs at \$B/MWh, Z MWs at \$C/MWh, where  $A < B < C$ ).

Suppliers will receive payments from the System Operator computed each hour by the following formula:

$$\text{Payment due} = \text{Energy}_{\text{Balancing Market}} \times \text{Purchase Tariff}_{\text{Balancing Market}}$$

Where:

$\text{Energy}_{\text{Balancing Market}}$  = the amount of energy in MWh, adjusted for losses, provided by a Supplier and utilized by the System Operator in the Balancing Market;

$\text{Purchase Tariff}_{\text{Balancing Market}}$  = the Supplier's price(s) submitted to the System Operator for the Balancing Market.

### 3.8 Administration of Market Activity

All bilateral contract activity shall be subject to such restrictions as may be required to permit the Dispatch Center and Settlements Center to properly discharge their responsibilities for economic

dispatch, associated contract administration and the provision of accurate energy settlement statements to all Participants.

## **4. IMPROVING EFFICIENCY OF THE POWER MARKET**

### **4.1 Metering Equipment**

A plan for the purchase and installation of metering equipment permitting hourly registration of power flows and related communications equipment should be developed and executed as soon as possible. In the interim, a methodology of allocating energy deliveries by hour or other time periods should be developed by the System Operator in collaboration with Suppliers, subject to review and approval of ANRE.

### **4.2 Dispatchable Contracts**

To improve system efficiency and reduce power costs, market Participants should be encouraged to engage not only in fixed schedule bilateral power contracts, but also in dispatchable bilateral power contracts which will permit better optimization of resources.

### **4.3 System Losses**

The System Operator in collaboration with Participants will develop, and submit for ANRE approval, an agreed system losses allocation methodology which will provide for an equitable allocation of losses associated with transactions on the system.

### **4.4 Market Committees**

The System Operator and ANRE will take the lead in creating a governance structure for the Power Market, including permanently functioning committees of Participants:

- a) To achieve a common understanding of market rules and procedures;
- b) To resolve current disputes or issues which arise in market operations; and
- c) To work out recommendations toward further development of the wholesale power market.

## **ANNEX 1**

[Note: The following is an extract from draft Moldova Market Rules with annotations for deviations necessary during the Transition Period]

### **7. SCHEDULING AND DISPATCH**

#### **7.1 Scheduling**

Scheduling is the process of developing the Forecast Schedule showing the projected dispatch levels for generators, External Transactions and Dispatchable Loads for the next Scheduled Dispatch Period.

#### **7.2 Scheduling and Dispatch Rights**

The resource provider and the System Operator each have rights related to the scheduling of resources depending on the point in time in the scheduling process, as follows:

- a) Prior to the daily deadline for a Scheduled Dispatch Period, the resource provider has the right to submit a self-schedule for that resource covering the Scheduled Dispatch Period.
- b) After the daily deadline and taking into account the self-scheduled resources submitted by providers, the System Operator has the right to determine schedules for all resources or portions of resources in accordance with all applicable Market Rules.
- c) The System Operator determines actual dispatch for all resources.

#### **7.3 Scheduling Principles**

The System Operator will use the following principles in developing the Forecast Schedule:

- a) The Weekly Forecast Scheduled period is Monday beginning 0001 and ending Sunday 2400.
- b) The Scheduled Dispatch period is the 24-hour period beginning 0001 and ending 2400 each day.
- c) The Forecast Schedule will be developed to ensure sufficient resources are scheduled to meet the anticipated total Forecast Demand. Operating Reserve Requirements of Moldova Control Area is presently covered by neighboring control areas.
- d) The Forecast Schedule will be developed with the objective of minimizing total production costs, taking into account the self-scheduled resources submitted by providers, while maintaining reliability standards over the Scheduled Dispatch Period.
- e) The System Operator will accept Self-Schedules for resources to the extent such schedules do not, in the System Operator judgement, violate a transmission constraint or cause an excess generation problem.



## **7.4 Inputs for Developing Forecast Schedule**

The System Operator will factor the following information into the development of the Forecast Schedule:

- a) the System Operator own Control Area Forecast Demand for the Scheduled Dispatch Period;
- b) *[not applicable in transition period]* forecast of Reserve Requirements for the Scheduled Dispatch Period;
- c) redeclarations of resource status;
- d) *[not applicable in transition period]* energy offers information;
- e) known generating resources' constraints (e.g. minimum run times, minimum down times, etc.) for the current Scheduled Dispatch Period;
- f) known or forecasted transmission constraints.

## **7.5 Development of Forecast Demand**

The process for developing Forecast Demand includes the use of computer software models, a weather and demand database, and personal professional experience and knowledge of the intricacies of demand as it responds to weather and other sociological conditions.

The forecasting process can be broken down into three steps:

### **7.5.1 Database Creation**

Hourly weather data and corresponding demand data are stored in a common database. Hourly temperature, humidity and precipitation are part of the detail in the hourly weather forecast. Any sociological impact on demand, such as the effect of school schedules or of a major event is also recorded for reference.

### **7.5.2 Forecasting Execution and Output**

A proven method of demand forecasting is to look for a historical day with weather similar to the Scheduled Dispatch period being forecast. Once found, the demand curve for that historical day can be adjusted for use in determining the Forecast Demand.

### **7.5.3 Interpretation of Software Output/Creation of Forecast Demand**

The outputs from the similar day and computer software models are compared, and manual adjustments are made to create the Forecast Demand. The similar day method provides the most accurate output because it correlates all of the weather variables. Its output is the starting point for developing the Forecast Demand. The System Operator may modify these outputs using its judgement in creating the final Forecast Demand.

## **7.6 Forecast Schedule Outputs**

The System Operator will provide participants with information in accordance with the System Operator information instructions.

The System Operator will develop and submit to participants the initial Weekly Forecast Schedule by XX:XX adjusted by periodic review each day for the next Scheduled Dispatch period and will:

- a) issue Dispatch Instructions to the designated contact for each power plant for the start up and shut down of its generator(s);
- b) *[not applicable in transition period]* provide participants with forecast hourly schedule of each generator's output including acceptance or rejection of a Self-Schedule;
- c) *[not applicable in transition period]* submit forecast schedule of Dispatchable Load interruptions to the designated contact for the Dispatchable Load;
- d) submit forecast schedule of External Transactions (available to the Participant party to the transaction);
- e) *[Transition period only]* submit the weighted average price of energy forecast to supply electricity for the Balancing Market  
*[not applicable in transition period]* submit forecast of hourly Energy Clearing Prices (ECP) (available to all);
- f) submit hourly Forecast Demand (available to all);
- g) other information as provided for in the System Operator Information Instructions.

## 7.7 Forecast Schedule Updates

After the initial Forecast Schedule for a Scheduled Dispatch Period is provided to participants, the System Operator will update the Forecast Schedule as required due to changing system conditions.

- a) Any change in system condition that causes the System Operator Control Area net electrical demand for any single hour in the dispatch period to change by +/- X MW, or by +/- X MW for 4 or more consecutive hours, shall require an update of the Forecast Schedule. The System Operator may also update the Forecast Schedule for events such as, but not limited to, the following:
  - i. substantial changes to the Forecast Demand required due to changes in the weather forecast, or outages caused by inclement weather;
  - ii. changes in generator capabilities as identified by Participant redeclarations;
  - iii. changes in External Transactions;
  - iv. change in the Operating Reserve Requirement for the Moldova Control Area.
- b) *[not applicable in transition period]* The System Operator will use the same inputs as defined in Market Rule No 2 – General Definitions when updating the Forecast Schedule.
- c) The System Operator will provide participants, in accordance with the information instructions, the following information in each update:
  - i. updated schedules of generator start ups and shut downs to the designated contact for each generator;
  - ii. updated hourly schedules of generator output (available to the owner(s)/Entitlement holder(s) of that generator);
  - iii. *[not applicable in transition period]* updated schedules of Dispatchable Load

- interruptions to the designated contact for that Dispatchable Load;
- iv. updated schedules of External Transactions (available to the Participant party to the transaction);
- v. *[not applicable in transition period]* updated forecast of hourly ECPs (available to all);  
During transition period: updated the weighted average price of energy to supply electricity for the Balancing Market
- vi. updated Forecast Demand (available to all);
- vii. other information as provided for in the System Operator information instructions.

## **7.8 Dispatch**

Dispatch is defined as the determination of the minute-to-minute generator output levels, dispatch levels for External Transactions, and on/off/level of partial interruption status for Dispatchable Loads (collectively referred to as Desired Dispatch Points for the rest of this procedure).

## **7.9 Dispatch Principles**

The Desired Dispatch Points are determined with the objectives of (in priority order):

- a) Maintaining at all times at least the minimum level of system reliability and security consistent with applicable national standards.
- b) Minimizing the system Energy production costs for the Scheduled Dispatch Period, taking into account national reliability and performance standards.

## **7.10 Overview of Real Time Dispatch Process**

The dispatch process will operate in two time frames as described below.

### **7.10.1 Prior to operating hour**

On an hourly basis, the System Operator will:

- a) Review the forecasted and actual updated system conditions for the upcoming hour and finalise the schedules of External Transactions (from the Forecast Schedule) with the operating authorities of adjacent Control Areas;
- b) Co-ordinate schedules of all short notice External Transactions for the next hour with the operating authorities of adjacent Control Areas;

### **7.10.2 Within the operating hour,**

- a) The System Operator may modify the Desired Dispatch Point as required after taking into account the following:
  - i. Control Area Forecast Demand;
  - ii. redeclarations;
  - iii. known transmission constraints.

- b) Periodically throughout the hour the System Operator will calculate a Desired Dispatch Point for each generator and Dispatchable Load.
- c) The System Operator will issue Dispatch Instructions to Participants during the hour indicating:
  - i. the Desired Dispatch Point for each synchronised generator;
  - ii. a Desired Dispatch Point (on/off/level of partial interruption) for each Dispatchable Load